

ABSTRACT

A method of forming a barrier metal film formed of a nitride film including tungsten by thermal CVD. The method includes positioning a substrate in a processing vessel and forming a WSi film on one side of the substrate by supplying a process gas including WF_6 gas and at least one of SiH_4 gas, SiH_2Cl_2 gas and Si_2H_6 gas into the processing vessel while a processing pressure in the processing vessel is maintained. The method also includes shutting off the supplying of the process gas into the processing vessel and completely removing the process gas from the processing vessel by supplying a purging gas into the processing vessel after the shutting off the supplying. The WSi film is nitrided by supplying NH_3 gas or MMH gas into the processing vessel from which the process gas has been removed, to form a WSi_xN_y film.